Volume 5, issue 4, 2016 • e-ISSN: 1857-8187 • p-ISSN: 1857-8179

Research Article

Hospital Acquired and Ventilator Associated Pneumonia

Healthcare

Keywords: mechanical ventilation, ventilator acquired pneumonia, tracheotomy.

Alma Cani		**University Hospital "Shefqet Ndroqi" Anesthesia & ICU Department Tirana, Albania.**
Fadil Gradica		**University Hospital "Shefqet Ndroqi" Thoracic Surgery Department Tirana, Albania.**
Loreta Agolli		**University Hospital "Shefqet Ndroqi" Respiratory Department Tirana, Albania.**
Fahri Kokici		**University Hospital "Shefqet Ndroqi" Thoracic Surgery Department Tirana, Albania.**

Abstract

Aim of study. To determine the incidence of Ventilator Associated Pneumonia (VAP) in the patients undergoing mechanical ventilation and to determine the predisposing factors of VAP after tracheotomy. Materials and methods. A retrospective study in 135 patients undergoing mechanical ventilation. During the study period (2010-2011). The study is conducted in the surgical and medical intensive care unit. At the time of entry, age, smoking history, history of chronic obstructive pulmonary disease (COPD), indication for mechanical ventilator, the Acute Physiology and Chronic Health Evaluation (APACHEII) score (11) were recorded daily. Results. The Patients that are included in our study were 135 patients, 95 men, and 40 women with a mean age of 64.0 ± 14.6 years. Mainly diagnosis that patients were admitted in intensive care unit (ICU); COPD in (n=32), neurological disorders (n=31) of COPD (n=46). Diagnosed by VAP were 32 patients (25%) of the 135 patients. A logistic regression model used to evaluate the effect of several factors on outcome. The presence of hyperthermia > 38 and duration with sedation [odd ratio (OR) 6.69; 4.25, 95% CI (Confidence Interval), P< 0.001; P< 0.005]. Conclusion: We conclude that it is very important giving the appropriate prophylactic antibiotic therapy specially for patients after tracheotomy, decreasing in this way the possibility of VAP. That's why we have to know who are the most frequently identified responsible pathogens in the unit; have to be informed of pulmonary secretions, the effects and characteristic of antibiotics for treating of VAP. [3,4,5]. Tracheotomy is predisposing factor for VAP. Using bronchoscopy before doing tracheotomy decrease incidence of VAP. Is important doing the microbiological analysis for determine the diagnose of infections. The accuracy of initial antibiotic has a great impact on survival.

Statistical analysis

Processing of the obtained results is made by the method of analysis of variance (ANOVA) using SPSS14, statistical program (Statistical Program for Social Sciences). In statistical processing are determined as mean ± standard derivation., are performed also statistical analysis: average, the error standard and error average of deviation standard. (One Sample Statistics) and (One Sample Test) which sets t statistic, is significant, the average error values of probability (P value). It is evaluated as statistically significant $P \leq 0.05$ being used for univariate analyses, meanwhile for categorical variables is performed Student's test.

With the logistic regression was performed multivariate analyses. Two categories (0 = absent, 1 = present were used for all variables. $P < 0.05$ was considered significant. A logistic regression model used to evaluate the effect of several factors on outcome. The presence of hyperthermia > 38 and duration with sedation [odd ratio (OR) 6.69; 4.25, 95% CI (Confidence Interval), $P < 0.001$; $P < 0.005$]

Results

The patients included in the study were 135 patients, 95 men, and 40 women. Mean age of 64.0 ± 14.6 years. The diagnosis of patients in ICU were COPD in (n=32), neurological disorders (n=31) .Infections of COPD (n=46). Pneumonia was the final diagnosis 35 patients (25%) of the 135 patients.

Table 1 shows the characteristic of 135 patients after tracheotomy. There were 35 patients clinically suspected of having pneumonia

Table 1. Study characteristics of 135 patients

VARIABLES	(Nr 100) Nr of non VAP patients	(Nr35) Nr of VAP patients	P
Age	64.0±14.6	64.5±13	0.86
Sex (male)	67	28	0.14
Sex (female)	33	7	
COPD%	55(55.0)	27(77.1)	< 0.03
Infections of COPD	32(32.0)	14(28.6)	
Neurological Disorder	26(26.0)	5(14.3)	
Pneumonia	22(22.0)	10(28.6)	
Others	20(20.0)	6(17)	

COPD=Chronic Obstructive Pulmonary Diseases

Tables 2 shows using sedation (n=39) (p < 0.09) patients without VAP and (n= 25) patients with VAP, mean of length of sedation 5.8±8.1 patients without VAP and 8.9±10.1 patients with VAP (p0.07)., mean of length in mechanical ventilation 17.4±14.0 patients without VAP and 19.2±11.2 patients with VAP (p0.47), patients with ventilator 47 without VAP and 22 with VAP (p0.1), mean of length of using antibiotics 13.0±10.8 patients without VAP and 14.6 ±10.8 patients with VAP (p0.47), after tracheotomy length per day 0.9 ±2.5 in patients without VAP and 4.1 ±6.3 in patients with VAP (p0.001)

Table 2. Study characteristics of 135 patients

VARIABLES	(Nr 100) Nr of no VAP patients	(Nr35) NR of VAP patients	P
Sedations	39(59.0)	25(71.4)	0.19
Length of ICU stay	5.8±8.1	8.9±10.1	0.07
Length of MV	17.4±14.0	19.2±11.2	0.47
Mechanical ventilator	47(47.0)	22(62.8)	0.1
Mean of duration with antibiotic	13.0±10.8	14.6±10.8	0.47
After tracheotomy length for day	0.9±2.5	4.1±6.3	0.001

ICU= Intensive Care Unit, MV = mechanical ventilation

Table 3. Logistic Regression Analysis

VARIABLES	OR	95% CI	P
Hyperthermia>38oC	6.69	18.1- 25.0	0.001
Duration with sedation	4.25	1.64-11.07	0.005

A logistic regression model used to evaluate the effect of several factors on outcome

The presence of hyperthermia > 38 and duration with sedation [odd ratio (OR) 6.69; 4.25, 95% CI (Confidence Interval), P < 0.001; P < 0.005]

Discussion

VAP in ventilated patients is dangerous, because the risk factors of pneumonia increased the mortality in these patients. In these study we performed a multivariate analysis, logistic regression.

Despite that we didn't determine the contribution of VAP to patient's mortality we saw the relationship between risk factors and mortality or severity of illness and risk of death. The most important outcome were the presence of ARDS (Acute Respiratory Distress Syndrome) and MOF (Multi Organ Failure). By other authors these results are comparable using either case control studies [4,8,12] or multivariate cohort analysis [6,7,9,10]. The relationship between VAP and mortality were performed by other investigators.[8], because of the antibiotic - resistant caused acquired pneumonia.[4,5,6] et al [13,14].

In our study, the patients under mechanical ventilation after 48h, we considered acquired pneumonia when patients showed three criteria: fever ≥ 38.5 o C; purulent thraceobronchial secretions; white blood cells (≥ 12,000/mm3) and new infiltrate persistent after 24 hour. Definitions for pneumonia are probably somewhat arbitrary and most episodes should be classified as probable pneumonia.

According to the American College of Chest Physician Guidelines the definitions for pneumonia are probably somewhat arbitrary and most episodes should be classified as probable pneumonia [11,12]. The SAP (Simplified Acute Physiology Score) is another way of analyzing attributable mortality at the time when pneumonia was diagnosed and look at the predicted mortality compared to the actual mortality. According to this, the overall the incidence of VAP among ICU patients with SAPS (Simplified Acute Physiology Score) of 14 was 50% [13,14], meanwhile in our study was 25% observed among our patients. In our study is that this patients received antibiotic treatment promptly after PSB (Protected specimen brush) and BAL (Bronchoalveolar Lavage), without waiting for microbiological results.

Conclusion

We conclude that it is very important giving the appropriate prophylactic antibiotic therapy specially for patients after tracheotomy, decreasing in this way the possibility of VAP. That's why we have to know who are the most frequently identified responsible pathogens in the unit; have to be informed of pulmonary secretions, the effects and characteristic of antibiotics for treating of VAP. [3,4,5]. Tracheotomy is predisposing factor for VAP. Using bronchoscopy before doing tracheotomy decreases incidence of VAP. Is important doing the microbiological analysis for determine the diagnose of infections. The accuracy of initial antibiotic has a great impact on survival.

References

1. Abele-Horn, M., A. Dauber, A. Bauernfeind, W. Russwurm, I. Seyfarth-Metzger, P. Gleich, and G. Ruckdeschel. 1997. Decrease in nosocomial pneumonia in ventilated patients by selective oropharyngeal decontamination (SOD). Intensive Care Med. 23:187-195.
2. Alvarez-Lerma, F., et al. 1996. Modification of empiric antibiotic treatment in patients with pneumonia acquired in the intensive care unit. Intensive Care Med. 22:387-394.
3. Ambrose, P. G., D. M. Grasela, T. H. Grasela, J. Passarell, H. B. Mayer, and P. F. Pierce. 2001. Pharmacodynamics of fluoroquinolones against Streptococcus pneumoniae in patients with community-acquired respiratory tract infections. Antimicrob. Agents Chemother. 45:2793-2797.
4. Ambrose, P. G., R. C. Owens, Jr., M. J. Garvey, and R. N. Jones. 2002. Pharmacodynamic considerations in the treatment of moderate to severe pseudomonal infections with cefepime. J. Antimicrob. Chemother. 49:445-453.
5. American Thoracic Society. 2005. Guidelines for the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia. Am. J. Respir. Crit. Care Med. 171:388-416.]
6. American Thoracic Society. 1996. Hospital-acquired pneumonia in adults: diagnosis, assessment of severity, initial antimicrobial therapy, and preventive strategies. A consensus statement, American Thoracic Society, November 1995. Am. J. Respir. Crit. Care Med. 153:1711-1725.

7. Antonelli, M., G. Conti, M. Rocco, M. Bufi, R. A. De Blasi, G. Vivino, A. Gasparetto, and G. U. Meduri. 1998. A comparison of noninvasive positive-pressure ventilation and conventional mechanical ventilation in patients with acute respiratory failure. N. Engl. J. Med. 339:429-435
8. Azoulay, E., J. F. Timsit, M. Tafflet, A. de Lassence, M. Darmon, J. R. Zahar, C. Adrie, M. Garrouste-Orgeas, Y. Cohen, B. Mourvillier, and B. Schlemmer. 2006. Candida colonization of the respiratory tract and subsequent Pseudomonas ventilator-associated pneumonia. Chest 129:110-117.
9. Baker, A. M., D. L. Bowton, and E. F. Haponik. 1995. Decision making in nosocomial pneumonia. An analytic approach to the interpretation of quantitative bronchoscopic cultures. Chest 107:85-95.
10. Baker, A. M., J. W. Meredith, and E. F. Haponik. 1998. Pneumonia in intubated trauma patients. Microbiology and outcomes. Am. J. Respir. Crit. Care Med. 153:343-349.
11. Bell, R. C., J. J. Coalson, J. D. Smith, and W. G. Johanson, Jr. 1999. Multiple organ system failure and infection in adult respiratory distress syndrome. Ann. Intern. Med. 99:293-298.
12. Bergmans, D. C., M. J. Bonten, P. W. De Leeuw, and E. E. Stobberingh. 2007. Reproducibility of quantitative cultures of endotracheal aspirates from mechanically ventilated patients. J. Clin. Microbiol.35:796-798.
13. Bergmans, D. C., M. J. Bonten, C. A. Gaillard, J. C. Paling, S. van der Geest, F. H. van Tiel, A. J. Beysens, P. W. de Leeuw, and E. E. Stobberingh. 2001. Prevention of ventilator-associated pneumonia by oral decontamination: a prospective, randomized, double-blind, placebo-controlled study. Am. J. Respir. Crit. Care Med. 164:382-388.
14. Bergstrom, C. T., M. Lo, and M. Lipsitch. 2008. Ecological theory suggests that antimicrobial cycling will not reduce antimicrobial resistance in hospitals. Proc. Natl. Acad. Sci. USA 101:13285-13290.